

**Teaching Undergraduate Biology With Bioinformatics**

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Attention has focused in recent years on developing graduate-level curriculum for programs in bioinformatics and computational biology. Many of these programs have been designed to bridge the gap between computer science and biology and are likely to attract students with above-average computer skills and an interest in programming. While it's important to foster the development of skilled professionals in this area, additional options are needed to serve the larger number of students, majoring in biology or biotechnology. These students may enter directly into the biotechnology workforce or they may pursue careers in medicine or research. No matter what path they choose, if today's biology students remain in a biology-related career, they will need to know how to use bioinformatics. Since these students will become the main consumers of bioinformatics resources and applications, they need to be familiar with the technology. For these students to gain familiarity with the technology and learn how to apply it effectively to do experiments with bioinformatics tools, bioinformatics must become part of the mainstream.

This project began with the realization that many bioinformatics resources could serve a dual purpose. First, using bioinformatics on a routine basis should help prepare biology students in their future careers. Second, it seemed likely that bioinformatics tools, developed with the goal of assisting researchers in understanding biology, could also help undergraduates understand biology, too. Either goal makes including bioinformatics in biology coursework, worthwhile. We are working towards the goal of making bioinformatics a standard part of the biology curriculum by helping teachers learn how to use bioinformatics in the classroom and by developing instructional materials that use bioinformatics to teach concepts in biology.

Presentations at workshops during the past four years have provided an opportunity to measure the use of bioinformatics in university, community college and high school classes throughout the United States. Data will be presented from 340 surveys that describe which instructors use bioinformatics, how it's used and the courses where it's used, and which applications are used. An overview of the instructional materials developed to date will be presented, as well.

*Funding for this project has been provided by NSF's CCLI Program under DUE-0088153 and DUE-0127599; from Bio-Link, an NSF ATE Center (Award #9850325); and from the Oak Ridge National Laboratory's Visiting Scientist Program at the NCBI.*